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(72) Inventor: Bertazzoni, Roberto  
42016 Guastalla (IT)

(74) Representative: Adorno, Silvano et al  
c/o SOCIETA' ITALIANA BREVETTI S.p.A.  
Via Carducci, 8  
20123 Milano (IT)

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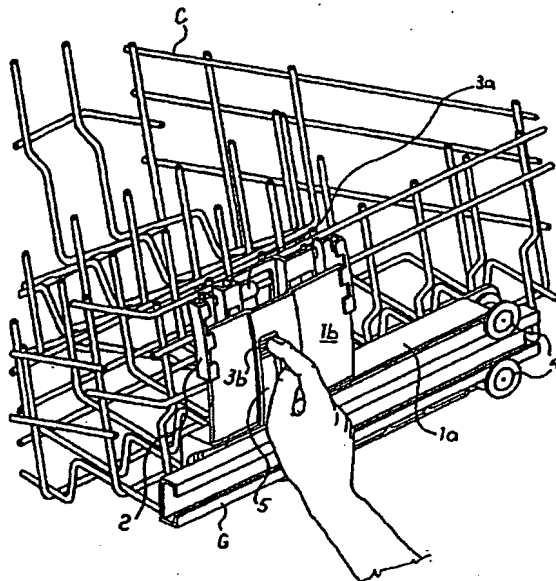
(71) Applicant: SMEG S.p.A.  
I-42016 Guastalla (IT)

(54) Device for changing the position in height for a dishwasher rack adjustable at various heights

(57) A device for changing the position in height of a dishwasher rack (C) slidably mounted on a guide (G) through wheels (4), including a support and guide bracket (1), a plate (2) provided with means for coupling to the rack (C), a latch (3) interposed between said guide (1b) and said plate (2) and integral with the latter, as well as a spring biasing the latch (3) against the bracket (1).

The latter consists of a lower elongated support (1a), on which the wheels (4) are secured, and an upper guide (1b), on which there is vertically slidably inserted the plate (2). The guide (1b) is provided with a locking tooth to lock the latch (3) and therefore the rack (C) at a raised position, while the disengagement of the latch (3) is performed through a window (5) by acting on its lower end (3b).

Fig. 6



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## Description

The present invention relates to dishwasher racks, and in particular to a device which allows to change the position in height of a rack adjustable at least at two different heights.

It is known that some dishwashers provide the possibility of changing the height of the upper rack, usually by selecting between two positions, so as to provide the user with a greater flexibility in exploiting the overall height of the washing tank. This is generally achieved through means located between the rack and the guides which support it within the tank.

Prior art devices are generally rather complicated both to manufacture and to operate, with resulting drawbacks of significant cost, poor practicality, great bulkiness and little reliability. An example thereof are the so-called "push-push" type devices, wherein the change of height is achieved by pushing the rack always in the same direction, typically upwards, by means of a mechanism similar to that of knock-on pens. In this case it is easy to operate the device unintentionally while pulling out the rack, with the risk of having the full upper rack falling down on the high crockery arranged in the lower rack.

In other cases, the operation requires the rack to be pulled out completely from the tank and/or is possible only when the rack is empty.

Therefore the object of the present invention is to provide a device suitable to overcome the above-mentioned drawbacks.

This object is achieved by means of a device having the characteristics disclosed in claim 1.

A first advantage of the device according to the present invention is its structural simplicity, which positively affects the cost, strength and reliability of the device.

A second advantage of the present device is its ease of operation, which allows its use with a single hand even when the rack is full and without having to pull it out completely from the tank.

Another advantage of the present device is to prevent the risk of unintentional descent of the rack upon its extraction.

These and other advantages and characteristics of the device according to the present invention will be clear to those skilled in the art from the following detailed description of an embodiment thereof, with reference to the annexed drawings wherein:

Figs. 1-4 are schematic vertical sectional views which illustrate the operation of the present device; Fig. 5 is a schematic perspective view showing a rack provided with the present device and positioned at a lower position; and Fig. 6 is an enlarged schematic view of the rack of fig. 5 at a higher position, with a detail of the device being operated for lowering.

With reference to the sectional views of figs. 1-4, taken along line A-A of fig. 5, there is seen that the device according to the present invention is made up of three pieces only, namely a guide and support bracket 1, a plate 2 for the coupling to rack C and a latch 3 interposed between bracket 1 and plate 2.

As shown also in figs. 5 and 6, bracket 1 consists of a lower elongated support 1a shaped like an inverted L, on which there are mounted wheels 4 for sliding on guide G, and an upper guide 1b extending vertically at the outer edge of the forward portion of the lower support 1a. The guide portion 1b is substantially flat, but it is provided in the vertical plane with a small inwards curvature, i.e. towards the rack. Guide 1b also has a vertically extending window 5 and a ramp 6, adjacent and parallel to window 5 on the inner face, ending at the top with a locking tooth 7.

Plate 2 is vertically slidably inserted on guide 1b thanks to its C-shaped vertical sides which enclose the vertical sides of guide 1b. In order to prevent the slipping out of plate 2 from guide 1b, stops (not shown in the figures) are provided on the inner face of guide 1b and correspondingly on the outer face of plate 2. The coupling of rack C to plate 2 is achieved through suitable lugs 8 formed on the inner face of plate 2. These lugs 8 are shaped almost as a quarter of a circle so as to receive and retain the horizontal metallic wires which make part of the side of rack C.

A seat for latch 3 is formed between the outer face of plate 2 and the inner face of guide 1b, at window 5 and ramp 6. The latch is pivoted onto plate 2 at its upper end 3a, which is suitably shaped so as to snap on a horizontal rod of said plate 2. The lower end 3b of latch 3 abuts on guide 1b and is accessible from the outer face through window 5. The contact of end 3b with the inner face of guide 1b is guaranteed by a small leaf spring 3c, integrally formed on the back of latch 3 and abutting against the outer face of plate 2.

The various phases of the simple operation of the device according to the present invention are clearly illustrated in the sequence of figs. 1-4.

Figures 1 and 5 illustrate the "rest" condition with rack C in the lower position. In this condition, plate 2 and the lower end 3b of latch 3 abut on the horizontal surface of the support portion 1a of bracket 1.

In order to take rack C to the upper position, it is sufficient to push it upwards on its right side (fig. 5), even without pulling it out from the dishwasher. In particular, fig. 2 shows how the lifting of rack C takes upwards plate 2 integral therewith and latch 3 pivoted at 3a on said plate 2. During the rise, the lower end 3b of latch 3 meets ramp 6 and therefore moves inwards thus compressing spring 3c. When end 3b reaches the end of ramp 6 (fig. 3), the push of spring 3c makes it jump outwards and thus engage the locking tooth 7. As a consequence, plate 2 and therefore rack C are retained in the upper position (fig. 6) by the locking tooth 7 which supports latch 3.

In order to take rack C back to the lower position it is sufficient to push inwards the end 3b of latch 3, by acting from outside through window 5 (figs. 4, 6), until it is disengaged from tooth 7. In this way it is the weight of rack C itself which tends to bring down end 3b along ramp 6 until it returns to the lower position of fig. 1. Therefore, also the lowering does not require to pull out rack C completely, but just as little as is necessary to bring window 5 out of the tank.

It should be noted that though in the illustrated embodiment the present device is located only on the right side of rack C, nothing prevents its use on the left side with a structure which is obviously specular with respect to the above-described structure. It is also possible to provide the rack with a pair of devices, one on each side, so as to give the user the possibility of raising the rack on the right side or on the left side or on both sides.

It is also clear that the device may be easily modified so as to provide a plurality of intermediate positions between the lower position and the maximum rise position. In order to achieve this it is sufficient to form a sequence of ramps 6, 6', 6'', etc. each ending with a relevant locking tooth 7, 7', 7'', etc. In this way latch 3, and therefore the rack, can be locked at various heights without changes to the operation of the device.

Furthermore, it is possible to reverse the mechanism which locks the movement of plate 2 along guide 1b. To this purpose, it is sufficient to pivot latch 3 on guide 1b so that its upper end is elastically biased inwards, and to provide the locking tooth 7 on plate 2 facing downwards. In this way, instead of having tooth 7 which supports latch 3 in the upper position, it will be latch 3 which supports tooth 7.

Therefore, it is clear that the above-described and illustrated embodiment of the device according to the invention is just an example susceptible of various modifications. In particular, the specific shapes, positions and sizes of the members of the device may be changed according to specific requirements. For example, spring 3b may be replaced by another elastic member, be it integral with latch 3 or not, and similarly rack C may be coupled to plate 2 through other coupling means different from lugs 8. Latch 3 could also be made integral with plate 2 or guide 1b as a deformable element thereof.

#### Claims

1. A device for changing the position in height of a dishwasher rack (C) slidably mounted on a guide (G) through wheels (4), characterized in that it includes a bracket (1) consisting of a lower elongated support (1a), on which said wheels (4) are secured, and an upper guide (1b), on which there is vertically slidably inserted a plate (2) provided with means for the coupling to the rack (C), and a latch (3) interposed between said guide (1b) and said plate (2) and pivoted on one of these members, as well as

elastic means biasing said latch (3) away from the member on which it is pivoted and pushing it in engagement with locking means suitable to lock the plate (2) at a plurality of different heights, and means for disengaging the latch (3) from said locking means.

2. A device according to claim 1, characterized in that the elastic means which push the latch (3) towards the locking means consist of a leaf spring (3c) integrally formed on the back of the latch (3).
3. A device according to claim 1 or 2, characterized in that the locking means consist of at least one horizontal locking tooth (7) formed at the end of a vertical ramp (6).
4. A device according to one or more of the preceding claims, characterized in that the means for disengaging the latch (3) consist of a window (5) through which said latch (3) is accessible from the outer face of the upper guide (1b).
5. A device according to one or more of the preceding claims, characterized in that the latch (3) is pivoted to the plate (2) at its upper end (3a), the latter being suitably shaped to snap on a horizontal rod of said plate (2).

Fig. 1

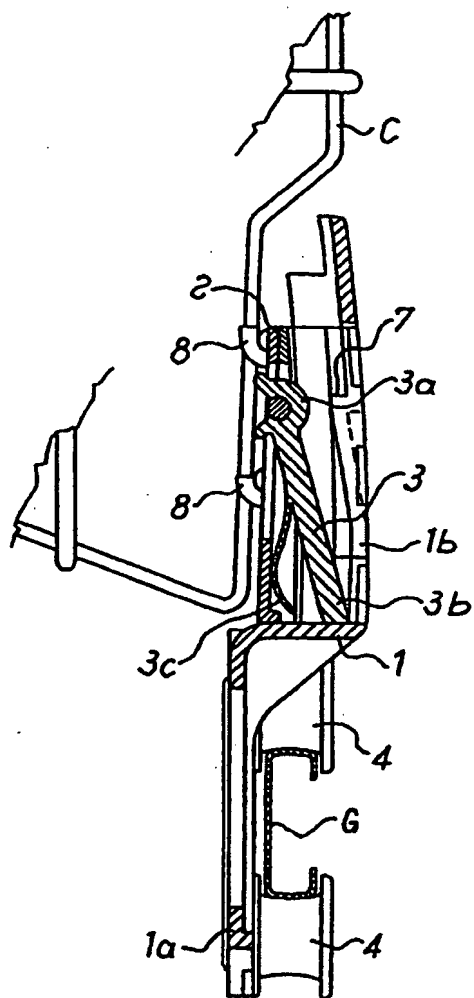


Fig. 2

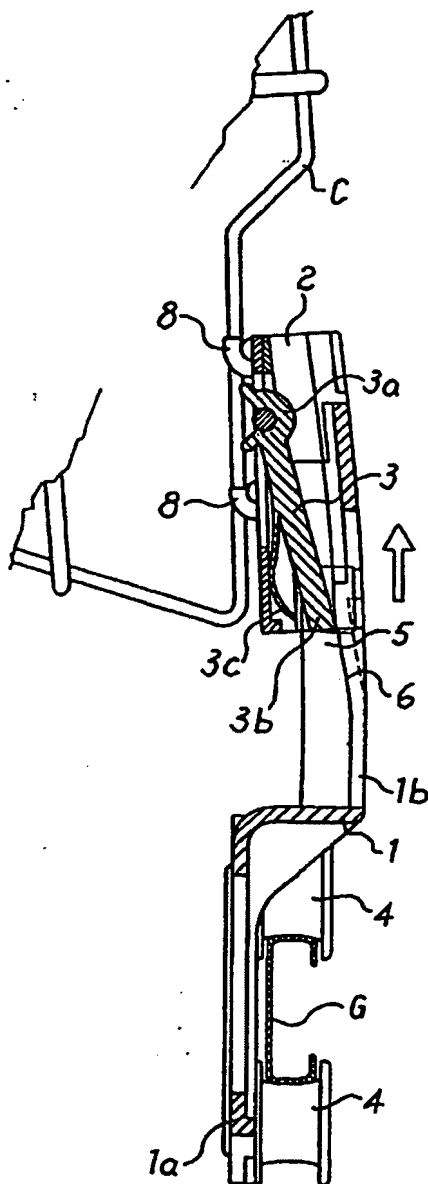


Fig. 3

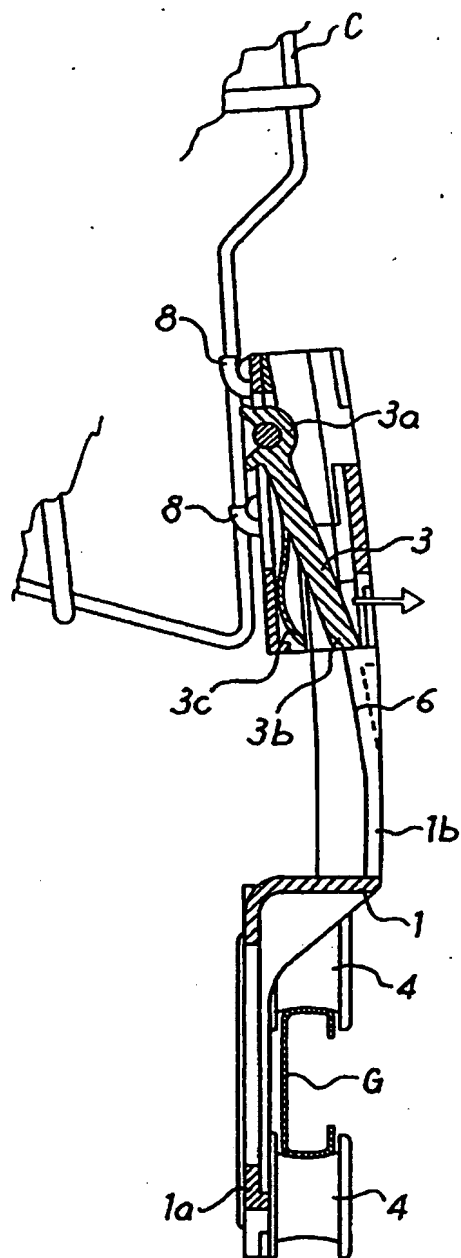
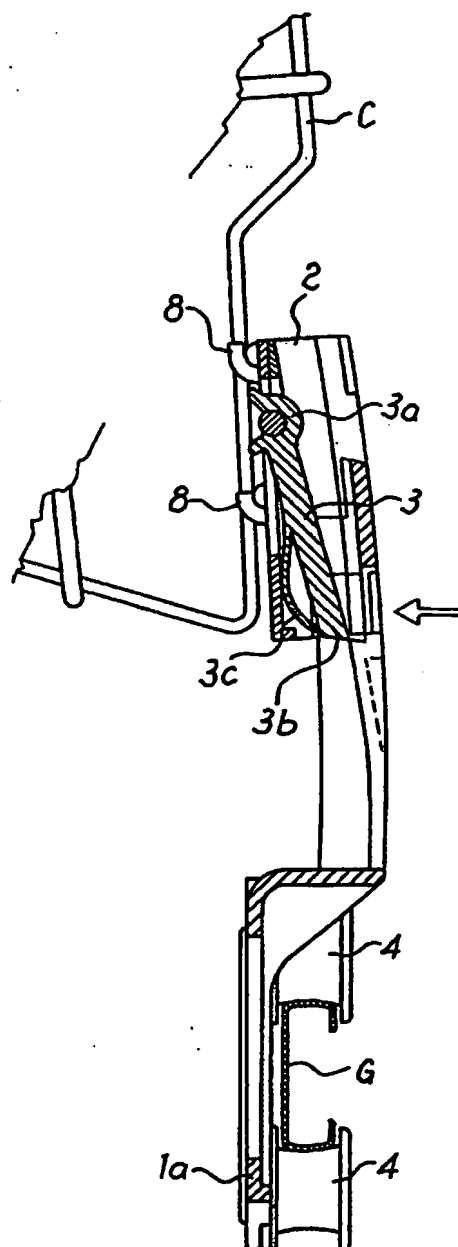


Fig. 4





*Fig. 6*

